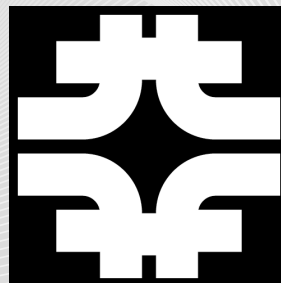# PATRIOT

Vision, Status, Direction

Project Review

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Most asked MC questions

1. How can I estimate the "theoretical" systematic uncertainty in a MC prediction?

   - Setting a limit, measuring a physics quantity

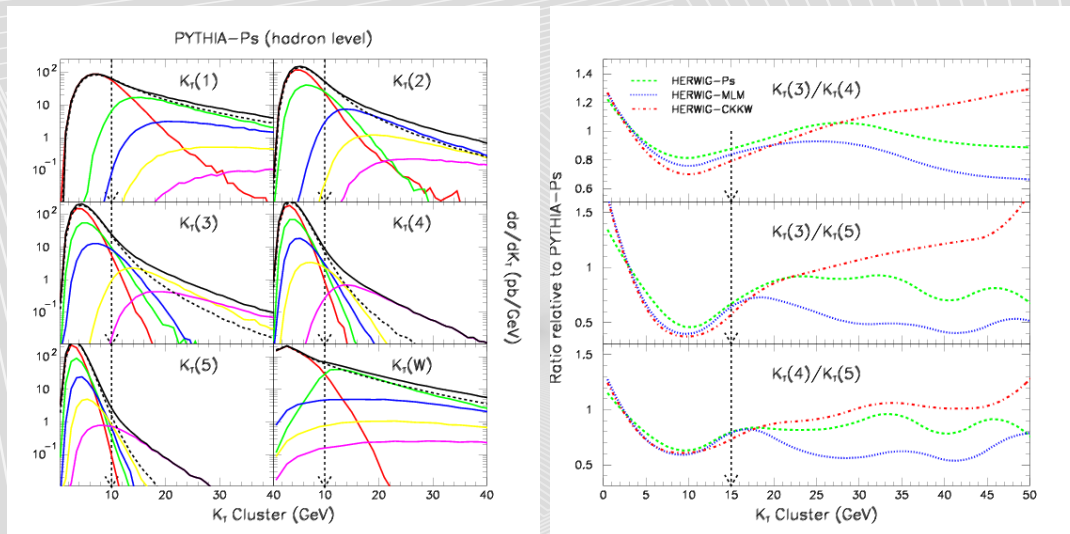2. How can I make better MC predictions?

   - i.e. 3 jets + PS $\oplus$ 4 jets + PS
   - setting a better limit, making a more powerful discovery

These are not unrelated!

Prime goal for Run2 and LHC physics

Better Predictions and Errors

$$k_T^2 = 2\min(E_i, E_j)^2(1 - \cos\theta_{ij}) \sim \min(E_i/E_j, E_j/E_i)m^2$$

Variation of parameters and methods yields systematic uncertainty

hep-ph/0312274

Lessons

- These calculations are not trivial

  need to be done and checked by experts

- Good computing resources are necessary

  computing farms, mass storage, etc.

- Nature of these calculations begs for databases and interface with experimental software

- mass storage
- standard format for files
- writeable from a computing farm
- searchable
- reasonably safe/secure

- easy to access by experiments, theorists

- files downloadable on hits

Patriot Status

1. Event generation

- Important new $W+$jet predictions
  - provided more events than the detector simulations can handle
  - asked by DØ to make smaller files
- hodge-podge of other samples (UC)
- Time devoted to theory development
- Serious overhead in developing tools to use the computing farm
  - Tasks/demands are unusual

2. SAM

- defined and implemented metadata (with Rick and Wyatt)
- added toy data sets
  - no pressure from expts. to go to SAM
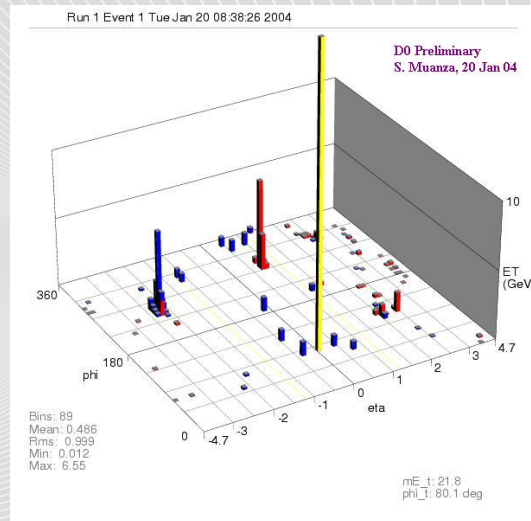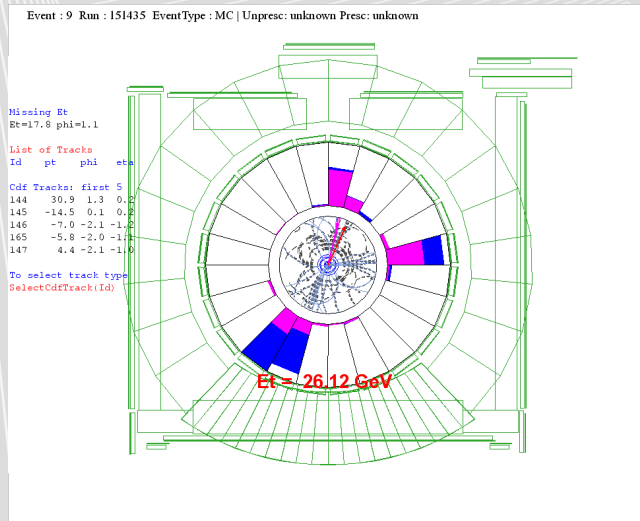- found path that works for CDF and DØ

3. Informational Database

- undeveloped

Processed Events

Theorist → Patriot → Experiment

Event : 9 Run : 151435 EventType : MC | Unpresc: unknown Presc: unknown

Missing Et
Et=17.8 phi=1.1

List of Tracks
Id   pt   phi   eta

Cdf Tracks: first 5
144   30.9 1.3 0.2
145   -14.5 0.1 0.2
146   -7.0 -2.1 -1.2
165   -5.8 -2.0 -1.1
147   4.4 -2.1 -1.0

To select track type
SelectCdfTrack(Id)

Et = -26.12 GeV

Run 1 Event 1 Tue Jan 20 08:38:26 2004

D0 Preliminary
S. Muanza, 20 Jan 04

ET
(GeV)

10

4.7

phi

360

180

0

eta

-4.7 -3 -2 -1 0 1 2 3

Bins: 89
Mean: 0.486
Rms: 0.999
Min: 0.012
Max: 6.55

mE_t: 21.8
phi_1: 80.1 deg

Roadblocks

1. Event generation

   - Need easier path for `dfarm` → `enstore`
     - Tools exist (kftp?), but I don't have expertise
   - Time must be devoted to theory development
   - io format still limited to 2 GB (MCFIO)

2. SAM

   - CDF SAM $\neq$ DØ SAM (why twice the effort?)
   - (non)-issue of `cdfen, d0en, stken` was a 6 month delay!
   - neither experiment seems to be in a hurry to use SAM
   - SAM-interface is not theorist-friendly

3. Informational database

   - Originally used `mcdb`
     - perl-based, nice web interface
     - located on L. Dudko's d0mino account
     - represents a security risk since data and scripts are intertwined
   - Port to CD machines with new directory structure failed
     - spent several weeks with Lynn and author

Patriot Direction

Action Items

- easier path from `dfarm` $\rightarrow$ `enstore`

- make `mcdb` database operational

  - is there a testbed machine to develop such tools?
  - how to develop the replacement?

- education on technical issues

  - how should my data be arranged on the enstore?
  - is there a better format for the data?
  - unknown unknowns

- regular meetings with feedback

- experimental (?) support to store data sets, update informational database